

Aug. 2, 1938.

A. L. ROSENMUND

2,125,461

MACHINE FOR MAKING WIRED BOX PARTS

Original Filed Oct. 2, 1935

6 Sheets-Sheet 1

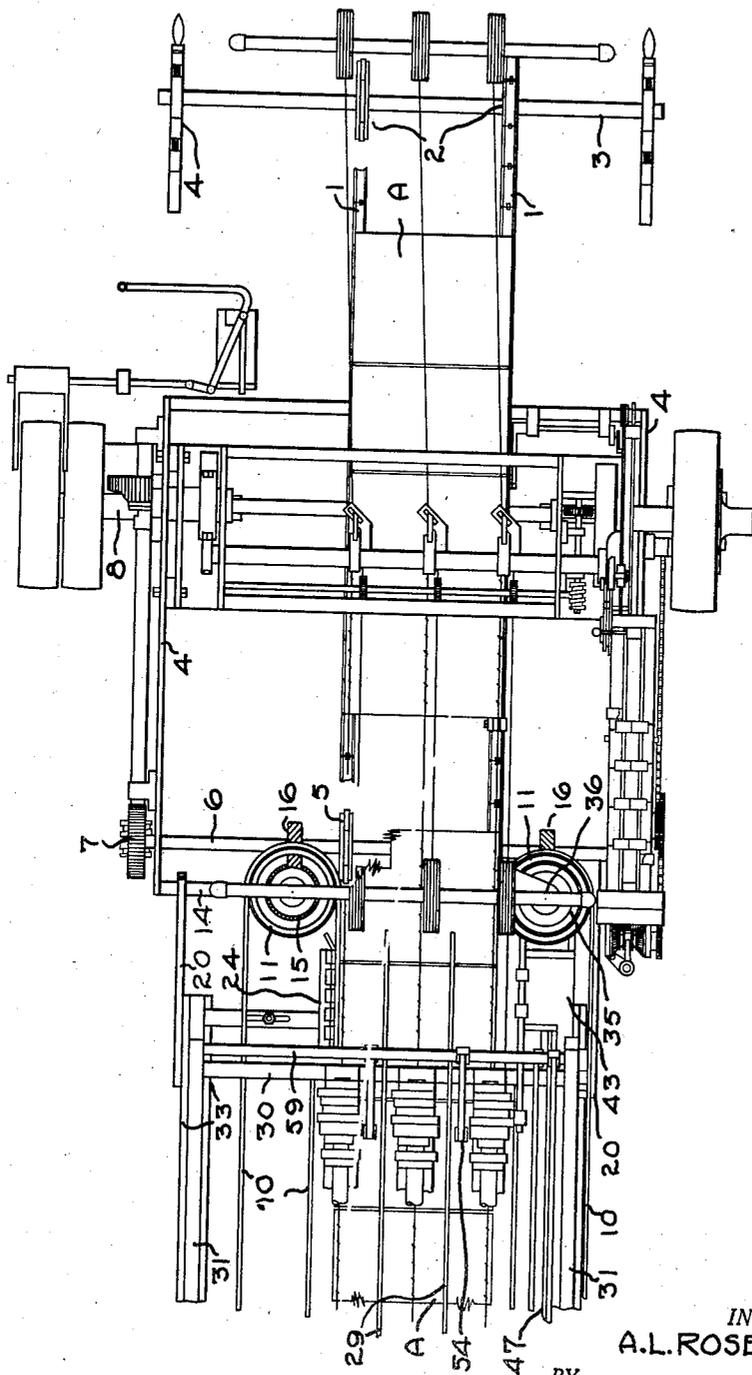


Fig. 1

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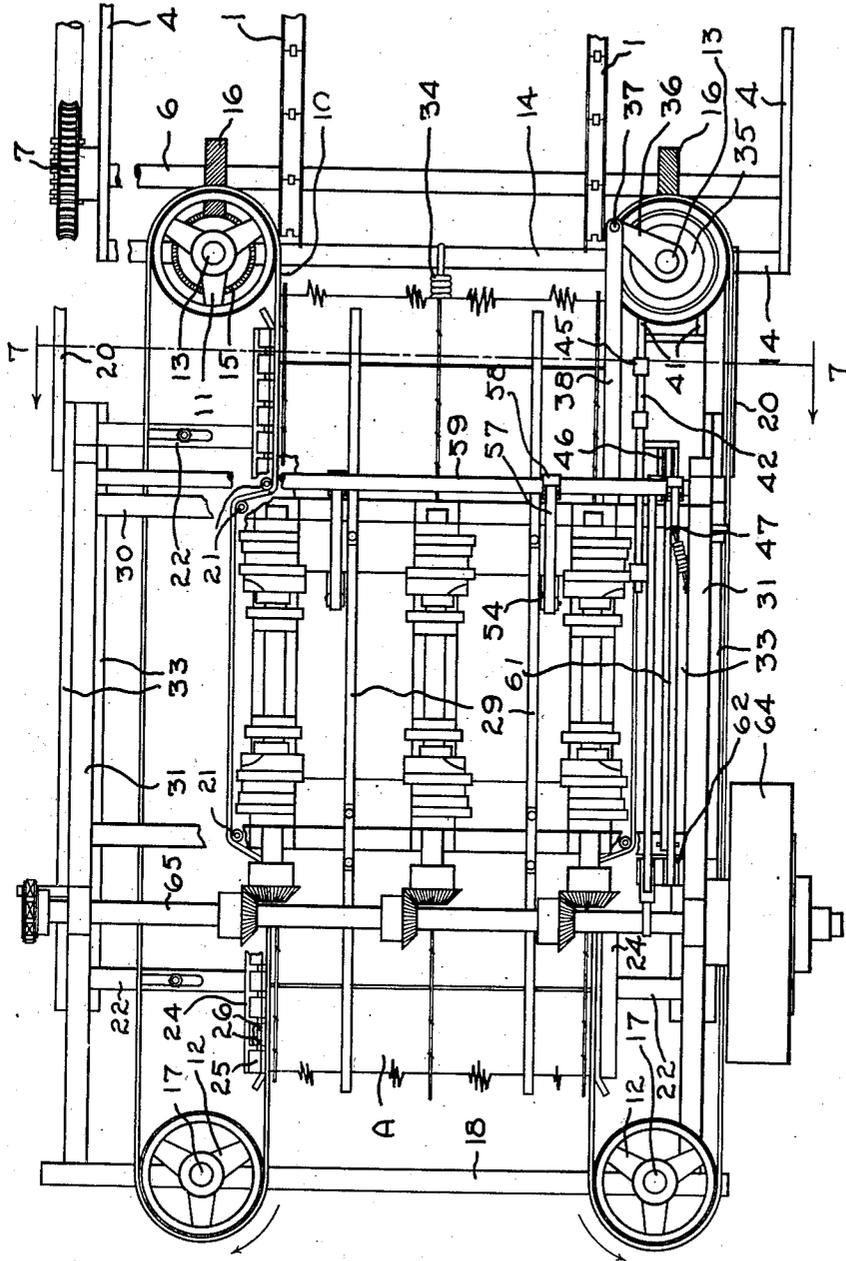


Fig. 2

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6 Sheets-Sheet 3

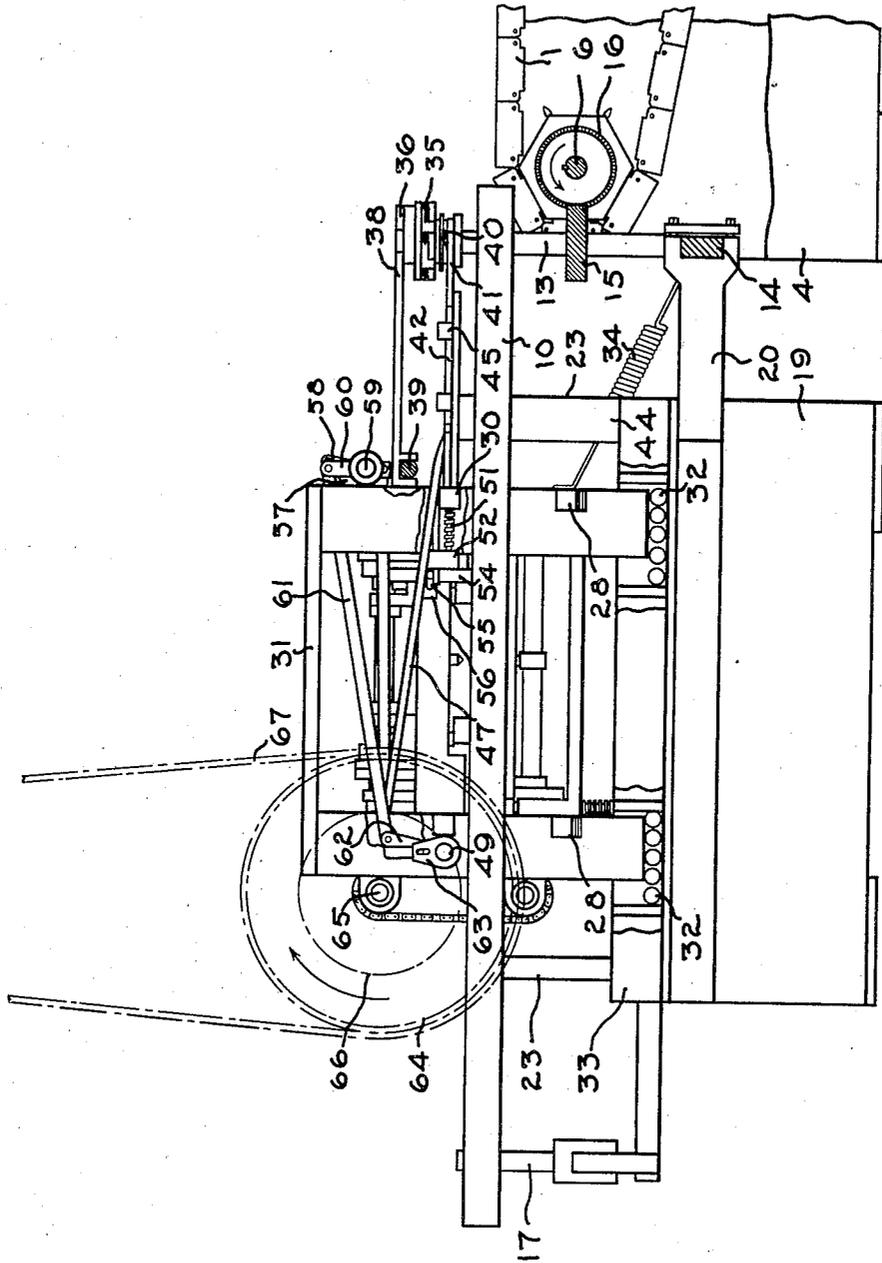


Fig. 3

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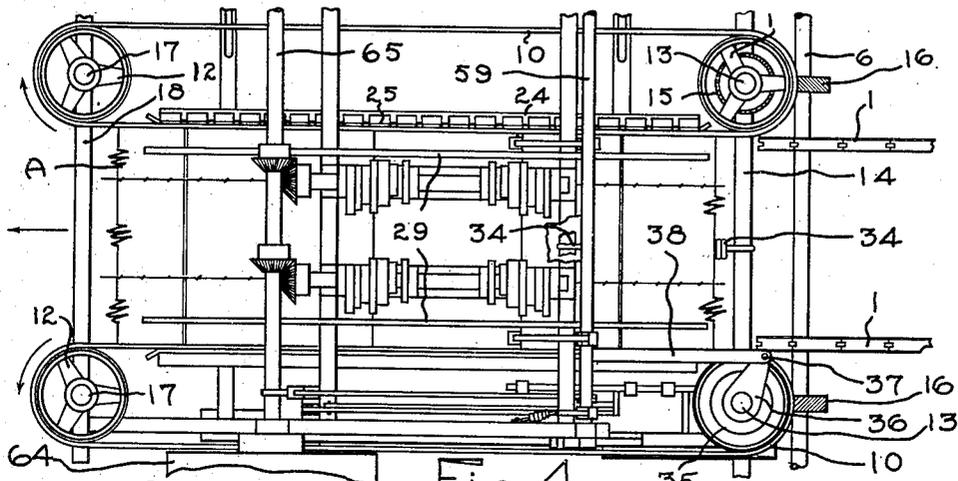


Fig. 4

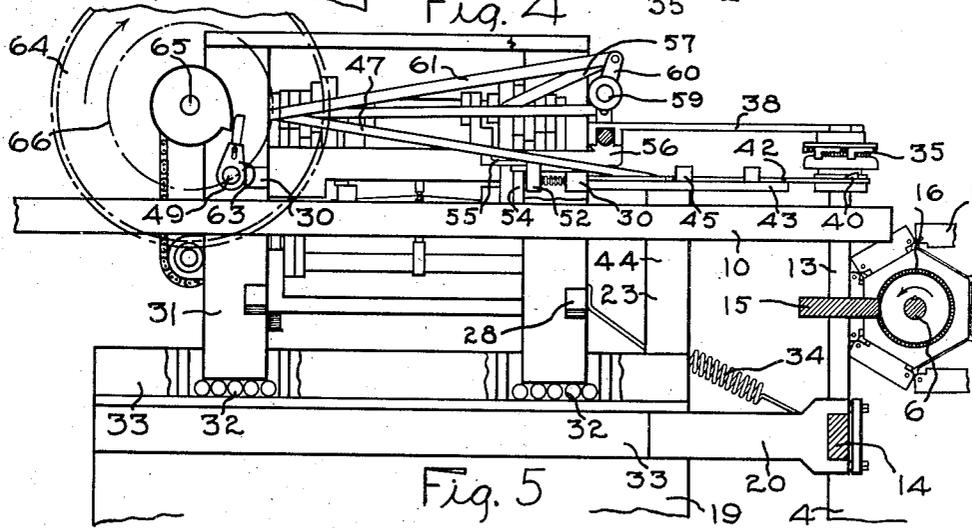


Fig. 5

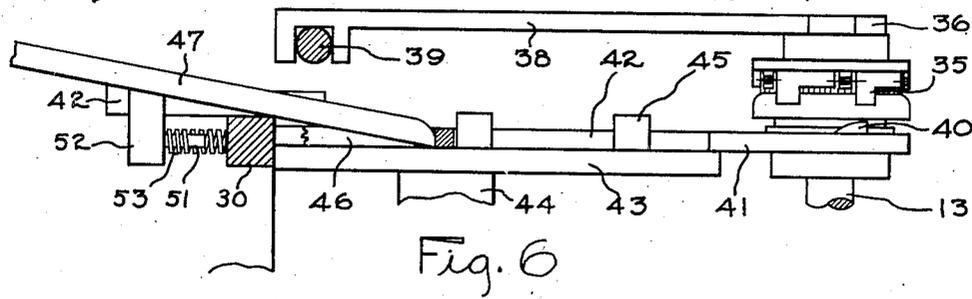


Fig. 6

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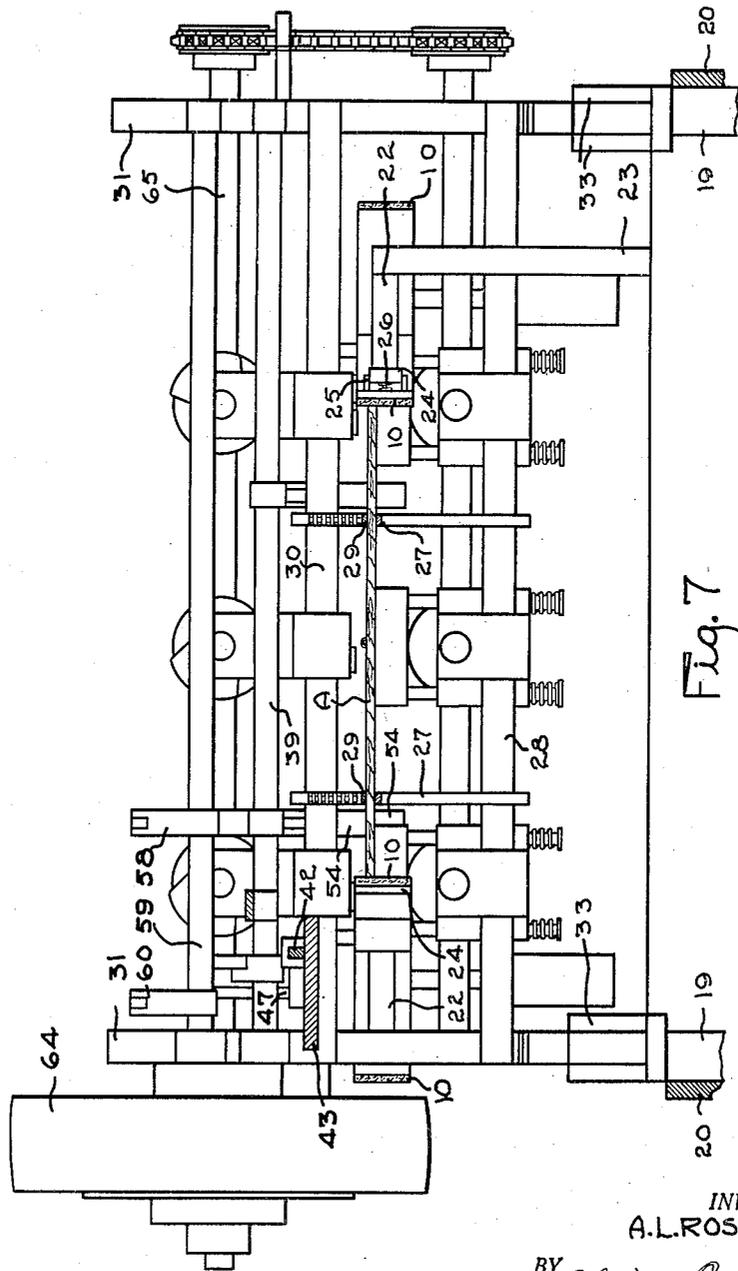


Fig. 7

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6 Sheets-Sheet 6

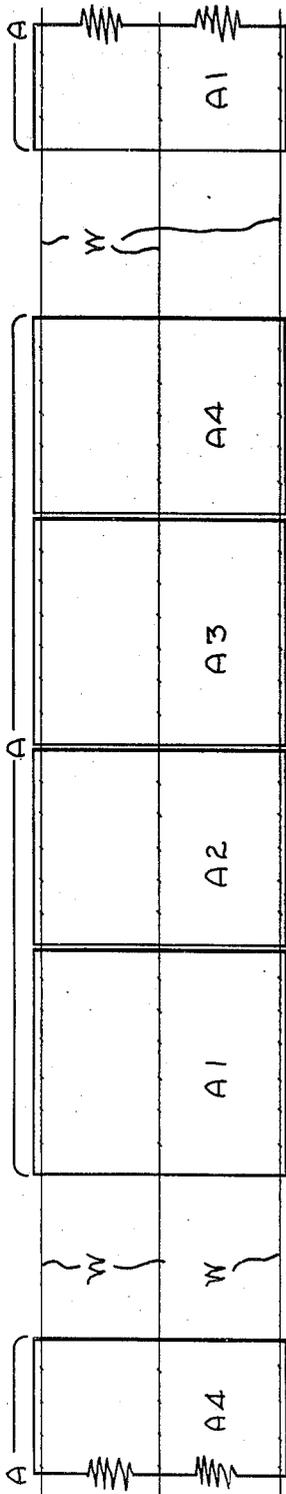


Fig. 8

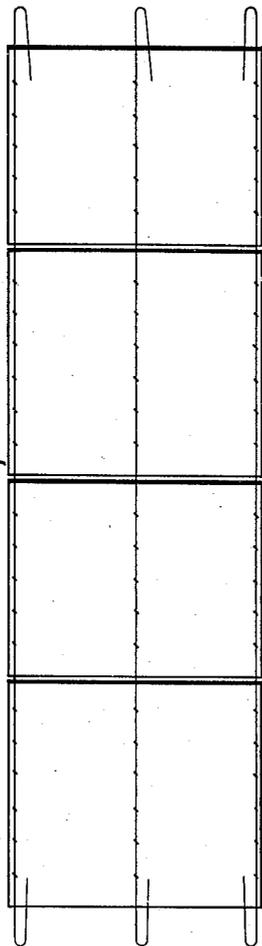


Fig. 9

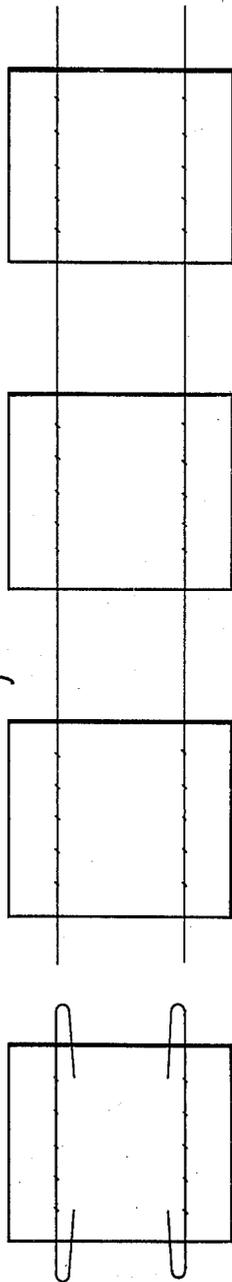


Fig. 10

Fig. 11

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UNITED STATES PATENT OFFICE

2,125,461

MACHINE FOR MAKING WIRED BOX PARTS

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Application October 2, 1935, Serial No. 43,151
Renewed December 29, 1937

47 Claims. (Cl. 140—93)

This invention relates to box-making machines and particularly to machines for making wired box parts.

It is an object of the invention to provide a unitized machine for stapling binding wires to box parts, severing the wires between box parts, bending the severed wires to form bights thereon, and driving the ends of the wires into the box parts to perpetuate the bights.

It is a further object of the invention to provide a machine of the character described with means for feeding the box parts through the machine continuously at substantially a uniform speed.

It is a further object of the invention to provide a machine of the character described in which the several mechanisms are automatically operated in accordance with the passage of the box parts through the machine.

It is a further object of the invention to provide a machine for forming a bight on a wire secured to a box part and driving the end of the wire into the box part to perpetuate the bight and in which means are provided for feeding automatically the box parts through the machine.

It is a further object to provide a machine of the character described which may be manufactured and operated economically and which is durable and efficient in operation.

Other objects will be in part obvious and in part pointed out hereinafter.

One illustrative embodiment of the invention is shown in the accompanying drawings, in which:—

Figure 1 is a top plan view of the receiving end of the machine and showing the mechanism for stapling binding wires to the box parts and for feeding the box parts to, through and away from the stapling mechanism.

Fig. 2 is a top plan view on a larger scale of the delivery end of the machine and showing the mechanism for severing the binding wires between box parts and for forming and perpetuating bights on the severed wires. This view also shows the means for feeding the wired box parts to, through and away from the bight-forming mechanisms.

Fig. 3 is a side elevation of the delivery end of the machine with certain parts omitted for clearness of illustration. In this view the bight-forming mechanisms are in non-operating position.

Fig. 4 is a plan view on a smaller scale of a modification of the delivery end of the machine shown in Fig. 2.

Fig. 5 is a side elevation of the delivery end of the machine shown in Fig. 2 with certain parts

omitted for clearness of illustration. In this view the bight-forming mechanisms have been thrown into operation and are moving with the work.

Fig. 6 is an enlarged side elevation of a portion of the mechanism for controlling movement with the work of the bight-forming instrumentalities.

Fig. 7 is a cross-sectional view taken on the line 7—7 of Fig. 2.

Fig. 8 is a top plan view of a succession of wired box blanks.

Fig. 9 is a top plan view of a completed box blank.

Fig. 10 is a top plan view of a succession of wired box ends.

Fig. 11 is a top plan view of a completed box end.

Referring to Fig. 8, the machine of this application is adapted (1) to receive and position in spaced relationship a succession of box blanks designated A, each blank consisting of four foldably related sections designated respectively A1, A2, A3 and A4, (2) to feed the blanks A past staple forming and driving mechanism which staples binding wires W to the succession of box blanks, (3) to sever the binding wires W between box blanks, (4) to bend the severed ends of the wires to form bights thereon, (5) to form a prong on each wire end (6) to drive the prongs into the box parts to perpetuate the bights, and (7) to clinch the prongs on the under side of the box parts.

The box parts are fed continuously at substantially a uniform speed past the staple forming and driving mechanism and the mechanism for severing the wires and forming bights thereon. A finished box blank is shown in Fig. 9.

The machine is also adapted to connect with wires a succession of box ends, as shown in Fig. 10, to sever the wires between box ends and to form bights thereon to produce the completed end shown in Fig. 11.

Heretofore two separate machines have been used to produce the complete box blank shown in Fig. 9 or to produce the complete box end shown in Fig. 11, one machine being used to staple the binding wires to the box parts and the other machine being used to sever the wires between box parts and form bights thereon.

A suitable machine for wiring the box parts is shown in my copending application Serial No. 37,107 filed August 21, 1935, reference to which is hereby made for a detailed description of the binding wire applying mechanism of the machine of this application and of the means for position-

ing and feeding the box parts past the staple forming and driving mechanism.

In the machine of said application Serial No. 37,107 the box parts are fed continuously at substantially a uniform speed, the staple forming and driving mechanism being constructed and arranged to operate at predetermined selected times to locate the staples at predetermined selected points in the work and to move with the work during staple driving operations, all as described in detail in said application.

A separate machine for severing the wires between box parts and forming bights thereon is shown in my copending application Serial No. 40,240 filed September 12, 1935, reference to which is hereby made for a detailed description of the wire-manipulating elements of this application, which sever the wires between box parts, bend them to form bights and drive the wire ends into the box parts to perpetuate the bights.

In the machine of said application Serial No. 40,240 no means are provided for feeding automatically the box parts through the machine or for moving the wire-manipulating elements with the box parts during a bight-forming operation. For this reason the binding wire applying machine and the bight-forming machine were necessarily operated independently of each other and as separate units, which retarded speed and efficient production.

In the machine of this application mechanisms are provided for automatically feeding the box parts continuously through the binding wire applying mechanism and the bight-forming mechanism, for moving the bight-forming mechanism with the moving box parts during a bight-forming operation and at substantially the same rate of speed and for automatically controlling the operations of the several mechanisms in properly timed relation and in accordance with the passage of the box parts through the machine, with the result that the box parts are placed on continuously moving conveyors at the receiving end of the machine, pass through the machine without interruption and come out of the delivery end of the machine as a finished product, thereby contributing to high speed mass production.

Referring to Fig. 1, the box parts are positioned and fed on endless conveyor chains 1, trained over idler sprocket wheels 2 on a shaft 3 supported by side frames 4 at one end of the stapling unit of the machine and trained over driven sprocket wheels 5 keyed to a shaft 6 journaled in side frames 4 at the other end of the stapling unit of the machine.

Shaft 6 is driven continuously at substantially a uniform speed through a gear 7 fast on shaft 6 and intermediate drive connections from a drive shaft 8, all as shown and described in said application Serial No. 37,107.

Referring to Fig. 2, as the wire-connected box blanks A leave the endless conveyor chains 1 of the stapling unit they are engaged at each side by endless belts 10 which are driven continuously at substantially the same rate of speed as the conveyor chains 1 and carry the blanks through the bight-forming unit of the machine.

Belts 10 pass around driven pulleys 11 at the receiving end of the bight-forming unit and around idler pulleys 12 at the delivery end of the bight-forming unit.

As shown in Fig. 3, driven pulleys 11 are fixed to a shaft 13 which rotates in bearings carried by a cross bar 14 supported by side frames 4 of the

stapling unit. Shafts 13 are rotated through a worm gear 15 fast on shaft 13 which meshes with a gear 16 keyed to shaft 6 of the stapling unit. The size of the gears 15 and 16 and of the pulleys 11 is such that the belts 10 are driven at substantially the same rate of speed as the conveyor chains 1.

Shafts 13 and their bearings are adjustable on cross bar 14 to permit the belts 10 to be moved toward and from each other to accommodate box parts of different widths. Likewise, gears 16 are adjustable toward and from each other on shaft 6.

Idler pulleys 12 are rotatably mounted on shafts 17 carried by a bar 18 supported by extensions secured to frame 19 of the bight-forming unit. Shafts 17 are adjustable on bar 18 to permit idler pulleys 12 to be moved toward and from each other.

Frames 19 which support the bight-forming unit and frames 4 which support the stapling unit are definitely related to each other and preferably rigidly connected by plates 20.

As shown in Fig. 2, the inner reach of each endless belt 10 is recessed by means of rollers 21, when a box blank having a wire adjacent each outer edge as there shown is being operated upon so that the belts will not interfere with the operation of the outside bight-forming units.

As shown in Fig. 4, the belts need not be recessed when box ends (having the wires set in a substantial distance from each edge) are being operated upon.

Adjustably secured to cross bars 22 supported by extensions 23 of frames 19 are guide bars 24 which carry presser members 25 to bear against the inner faces of the inner reaches of the endless belts 10. Interposed between the guide bars 24 and the pressers 25 at one side of the machine are a plurality of springs 26 which yieldingly press the pressers 25 against the belts 10 and thus press the belts 10 into gripping contact with the sides of the box blank to carry the box blank through the machine with the belts.

The box blanks in their passage through the bight-forming unit are supported by rods 27 carried by cross frame members 28. The box parts are held against vertical movement by presser bars 29 carried by cross frame members 30.

As shown in Fig. 3, the bight-forming instrumentalities and the means for operating the same are carried by a frame 31 which is adapted to reciprocate horizontally on rollers 32 between guides 33 carried by frames 19. Frame 31 and the bight-forming instrumentalities carried thereby are normally held in the position shown in Fig. 3 by a spring 34 secured at one end to the frame 31 and at the other end to cross bar 14. When a box part reaches the bight-forming mechanism the frame 31 is moved with the moving box parts and at the same rate of speed by the mechanism now to be described.

Referring to Figs. 2 and 3, there is mounted on the upper end of the continuously rotating vertical shaft 13 a clutch 35 of intermittent type and which is adapted to be clutched to the shaft 13 at selected times in the manner hereinafter described. Clutch 35 carries an arm 36 connected by a pin 37 to a rod 38, the other end of which is connected to a cross rod 39 carried by movable frame 31. The length of the arm 36 is such that rotation of shaft 13 will move frame 31 at the same rate of speed as conveyor chains 1 and belts 10.

Referring to Fig. 6, clutch 35 is operated by

lobes 40 carried by forked arms 41 secured to a frame 42 slidable horizontally on a table 43 carried by extensions 44 of frame 19. Frame 42 is positioned and guided on table 43 by guide blocks 45 secured to table 43.

Frame 42 is provided at its left hand end (Fig. 6) with a slot or recess 46 to receive the end of a rod 47, the other end of which (see Fig. 3) is connected to a link 61 which in turn is connected with a link 62 fixed to a rock shaft 49 journaled in frame 31. When shaft 49 is rocked in a clockwise direction (Fig. 3) rod 47 will be moved to the right, and its contact with the end of the slot or recess 46 in the frame 42 will move frame 42 carrying lobes 40 to the right, and this movement will throw clutch 35 into clutching engagement with shaft 13, as shown in Fig. 6. Thereupon, rod 33 will move frame 31 with the work and at the same rate of speed. Movement of frame 31 will continue just long enough to permit the bight-forming mechanisms to complete one operation, whereupon frame 42 and its lobes 40 will be returned to initial position to disengage the clutch 35.

Frame 42 is returned to initial position through the action of cross frame member 30 carried by frame 31 which contacts a plunger 51 extending from a bracket 52 carried by frame 42. Surrounding plunger 51 is a spring 53 to insure positive return of the frame 42.

Rock shaft 49 is rocked to cause operation of clutch 35 by the action of the forward edge of the incoming box part which contacts and moves a trigger 54 pivotally mounted by a pin and slot connection 55 on an arm 56 secured to rod 39 (see Fig. 5). The lower end of trigger 54 lies in the path of travel of the incoming box part. The upper end of the trigger 54 is connected by a link 57 to a link 58 secured to a rock shaft 59 journaled in brackets secured to frame 31. Also secured to rock shaft 59 (as shown in Fig. 3) is a link 60 having a pin connection with the link 61, the other end of which is connected by a pin to the link 62 fast on rock shaft 49.

When the incoming box part engages and moves the lower end of trigger 54 to the left in Fig. 5, the upper end of the trigger 54 will move to the right, rocking shaft 59 in a clockwise direction and through links 60, 61 and 62, rocking shaft 49 also in a clockwise direction. This movement of shaft 49 will move rod 47 and frame 42 to the right to throw in clutch 35.

The same rocking movement of shaft 49 will throw a clutch buffer 63 from the position shown in Fig. 3 to the position shown in Fig. 5 to clutch a drive pulley 64 to a drive shaft 65 which is journaled in frame 31 and actuates the bight-forming mechanism carried by the frame 31.

The bight-forming mechanisms and their operation are fully described in my copending application Serial No. 40,240 and need not be described in detail herein, it being sufficient to say that when pulley 64 is clutched to shaft 65 the bight-forming mechanisms will be thrown into operation for one complete cycle of operation. The clutch, designated 66 (see Fig. 5) is a one cycle clutch and automatically disengages after one complete cycle of operation.

Thus it will be seen that when the forward edge of the incoming box part strikes trigger 54, the movement of trigger 54 will automatically throw into operation clutch 35 to move frame 31 with the work and at the same time clutch pulley 64 to shaft 65 to cause the bight-forming mechanism to operate during its movement with the work. When the bight-forming operation is

completed, clutch 66 is disengaged in the manner described in my application Serial No. 40,240, clutch 35 is disengaged in the manner hereinbefore described, and frame 31 is returned to initial position through the action of spring 34.

Pulley 64 may be operated by a belt 67 from a line shaft or in any other suitable manner.

The operation of the machine will be readily understood from the foregoing detailed description. The box parts are placed on the continuously moving chains 1 which feed the box parts beneath the stapling mechanism which staples the binding wires thereto. As the wired box parts leave the endless conveyor chains 1 they are engaged by the endless belts 10 and moved continuously and without interruption through the bight-forming unit of the machine. As the forward edge of each unit of work strikes the trigger 54, the bight-forming mechanisms are thrown into operation and are moved with the work while performing a bight-forming operation. After a bight-forming operation the bight-forming mechanisms are returned to initial position while the continuously moving belts 10 carry the completed product out of the machine.

It will be noted that with the machine in operation the attendants simply place the box parts on the endless conveyors 1 at the receiving end of the machine and remove the completed product from the belts 10 at the delivery end of the machine, the several mechanisms being operated automatically in accordance with the passage of box parts through the machine.

It will be understood that the invention is not to be limited to the specific embodiment shown for purposes of illustration and that all of the inventive features need not be used conjointly as they may be used to advantage in various combinations as defined in the sub-joined claims.

I claim:

1. A machine for making box parts comprising, in combination, staple forming and driving mechanism to staple binding wire to a succession of box parts, means to sever the binding wire between box parts, means to bend each severed wire to form a bight thereon, means to drive the end of each severed wire into its box part to perpetuate the bight, means to feed the box parts through the machine, means to control the operation of the stapling mechanism in accordance with the passage of the box parts through the machine, and means to move said mechanisms with the work during the respective operations of said mechanisms.

2. A machine for making box parts comprising, in combination, staple forming and driving mechanism to staple binding wire to a succession of box parts, means to sever the binding wire between box parts, means to bend each severed wire to form a bight thereon, means to drive the end of each severed wire into its box part to perpetuate the bight, means to feed the box parts through the machine, means to control the operations of the bight-forming and perpetuating means in accordance with the passage of the box parts through the machine, and means to move the stapling mechanism and the bight-forming operations of said mechanisms.

3. A machine for making box parts comprising, in combination, staple forming and driving mechanism to staple binding wire to a succession of box parts, means to sever the binding wire between box parts, means to bend each sev-

- ered wire to form a bight thereon, means to drive the end of each severed wire into its box part to perpetuate the bight, means to feed the box parts through the machine, means to control the operations of the bight-forming and perpetuating means in accordance with the passage of the box parts through the machine, and means to move the bight-forming and perpetuating means with the box parts during a bight-forming and perpetuating operation.
4. A machine for making box parts comprising, in combination, staple forming and driving mechanism to staple binding wire to a succession of box parts, means to sever the binding wire between box parts, means to bend each severed wire to form a bight thereon, means to drive the end of each severed wire into its box part to perpetuate the bight, means to feed the box parts through the machine, means to control the operations of the bight-forming and perpetuating means in accordance with the passage of the box parts through the machine, and means to move the staple forming and driving mechanism with the box part during a staple forming and driving operation.
5. A machine for making box parts comprising, in combination, staple forming and driving mechanism to staple binding wire to a succession of box parts, means to sever the binding wire between box parts, means to bend each severed wire to form a bight thereon, means to drive the end of each severed wire into its box part to perpetuate the bight, means to feed the box parts continuously through the machine, and means to control the operations of the bight-forming and perpetuating means in accordance with the passage of the box parts through the machine.
6. A machine for making box parts comprising, in combination, staple forming and driving mechanism to staple binding wire to a succession of box parts, means to sever the binding wire between the box parts, means to bend each severed wire to form a bight thereon, means to drive the end of each severed wire into its box part to perpetuate the bight, means to feed the box parts through the machine, and means to control the operations of the bight-forming and perpetuating means in accordance with the passage of the box parts through the machine.
7. A machine for making box parts comprising, in combination, means to apply a flexible binder to a succession of box parts, means to sever the flexible binder between box parts, mechanisms to bend the severed ends of the binder to form a bight on each severed end, means to drive the end of each binder into its box part to perpetuate the bight, and means to feed the box part through the machine.
8. A machine for use in making box parts comprising, in combination, means to apply a flexible binder to a box part, mechanisms to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, and means to feed the box part through the machine.
9. A machine for making wired box parts comprising, in combination, means to apply a binding wire to a box part, mechanisms to bend the wire to form a bight and to drive the end of the wire into the box part to perpetuate the bight, means to feed the work to the binding wire applying means, and separate means to feed the work to the bight-forming mechanisms, said two feeding means operating at substantially the same rate of speed.
10. A machine for making wired box parts comprising, in combination, means to apply a binding wire to a box part, mechanisms to bend the wire to form a bight and to drive the end of the wire into the box part to perpetuate the bight, means to feed the work to the binding wire applying means, and separate means to feed the work to the bight-forming mechanisms.
11. A machine for making wired box parts comprising, in combination, means to apply a binding wire to a box part, mechanisms to bend the wire to form a bight and to drive the end of the wire into the box part to perpetuate the bight, means to feed the box part through the machine, and means controlled in accordance with the passage of the box part through the machine to operate the binding wire applying means and the bight-forming mechanisms.
12. A machine for making wired box parts comprising, in combination, means to apply a binding wire to a box part, mechanisms to bend the wire to form a bight and to drive the end of the wire into the box part to perpetuate the bight, means to feed the box part through the machine, and means controlled by the box part to operate said mechanisms.
13. A machine for making wired box parts comprising, in combination, means to apply a binding wire to a box part, mechanisms to bend the wire to form a bight and to drive the end of the wire into the box part to perpetuate the bight, means to feed the box part through the machine, and means to move said mechanisms with the work.
14. A machine for making wired box parts comprising, in combination, means to apply a binding wire to a box part, mechanisms to bend the wire to form a bight and to drive the end of the wire into the box part to perpetuate the bight, and means to feed box parts through the machine continuously.
15. A machine for making wired box parts comprising, in combination, means to apply a binding wire to a box part, mechanisms to bend the wire to form a bight and to drive the end of the wire into the box part to perpetuate the bight, and means to feed the box part through the machine.
16. A machine for forming bights on a plurality of wires secured to and connecting two box parts comprising, in combination, means to sever the wires between the box parts, mechanisms to bend each severed wire to form a bight thereon and to drive the end of the wire into its box part to perpetuate the bight, and means to feed the box parts to said mechanisms.
17. A machine for forming bights on a flexible binder secured to and connecting two box parts comprising, in combination, means to sever the flexible binder between the box parts, mechanisms to bend each severed binder to form a bight and to drive the end of the binder into its box part to perpetuate the bight, and means to feed the box parts to said mechanisms.
18. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, mechanisms to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, means to feed the box part to said mechanisms, and means controlled by the box part to operate said mechanisms and to move said mechanisms with the box part.
19. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, mechanisms to bend the binder to form a bight and to drive the end of the binder into the

box part to perpetuate the bight, means to feed the box part to said mechanisms, and means controlled by the box part to operate said mechanisms.

20. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, mechanisms to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, means to feed the box part to said mechanisms, and means automatically to control the operation of said mechanisms in accordance with the passage of the box part through the machine.

21. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, mechanisms to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, means to feed the box part to said mechanisms, and means to move said mechanisms with the box part during a bight-forming operation.

22. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, mechanisms to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, and movable means yieldingly pressed against the box part to feed the box part to said mechanisms.

23. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, mechanisms to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, and a spring-pressed endless belt to feed the box part to said mechanisms.

24. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, mechanisms to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, and means engaging opposite edges of the box part to feed the box part to said mechanisms.

25. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, mechanisms to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, and endless belts to feed the box part to said mechanisms.

26. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, mechanisms to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, and means to feed box parts continuously to said mechanisms.

27. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, mechanisms to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, and means to feed the box part to said mechanisms.

28. A machine for making box parts comprising, in combination, mechanism to apply a flexible binder to a succession of box parts, means to sever the binder between box parts, means to bend each severed binder to form a bight thereon, means to drive the end of each severed binder into its box part to perpetuate the bight, means to feed the box parts through the machine, and means to control the operation of the bight-forming and perpetuating means in accordance with the passage of the box parts through the machine.

29. A machine for making box parts comprising, in combination, means to apply a flexible binder to a succession of box parts, means

to sever the flexible binder between box parts, mechanisms suspended above the box parts to bend the severed ends of the flexible binder to form a bight on each severed end and to drive the end of each binder into its box part to perpetuate the bight, means to raise the flexible binder to present it to the operation of said mechanisms, and means to feed the box part through the machine.

30. A machine for making box parts comprising, in combination, means to apply a flexible binder to a box part, mechanisms suspended above the box part to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, means to raise the binder to present it to the operation of said mechanisms, and means to feed the box part through the machine.

31. A machine for making box parts comprising, in combination, means to apply a flexible binder to a box part, mechanisms suspended above the box part and operable upon a moving box part to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, means to raise the binder to present it to the operation of said mechanisms, and means to feed the box part through the machine continuously.

32. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, a support for the box part, mechanisms suspended above the box part to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, means to raise the binder to present it to the operation of said mechanisms, and means to feed the box part through the machine.

33. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, a support for the box part, mechanisms suspended above the box part and operable upon a moving box part to bend the binder to form a bight and to drive the end of the binder into the box part to perpetuate the bight, means to feed the box part through the machine, and means to raise the binder during its movement through the machine to present it to the operation of said mechanisms.

34. A machine for forming a bight on a flexible binder secured to a box part comprising, in combination, wire-manipulating mechanisms to bend the binder to form a bight, to bend the end of the binder to form a prong, to drive the prong into the box part to perpetuate the bight and to clinch the end of the prong, and means to feed the box part through the machine.

35. A machine for forming and perpetuating substantially a U-shaped bight on a metallic binder secured to and extending from a box part, comprising a cutter to sever the binder a predetermined distance from the box part edge, means to bend the binder a distance from its end to swing the end of the binder over the box part and form substantially a U-shaped bight, means to bend the binder adjacent its end to form a prong, a driver to drive the prong through the box part, a clincher to clinch the prong on the under side of the box part, means to feed the box part through the machine, and means automatically to control the operations of the bight-forming instrumentalities in accordance with the passage of the box part through the machine.

36. A machine for forming and perpetuating substantially a U-shaped bight on a metallic binder secured to and extending from the box

part, comprising a cutter to sever the binder a predetermined distance from the box part edge, means to bend the binder a distance from its end to swing the end of the binder over the box part and form substantially a U-shaped bight, means to bend the binder adjacent its end to form a prong, a driver to drive the prong through the box part, a clincher to clinch the prong on the under side of the box part, means to feed the box part through the machine, and means controlled by the box part in its passage through the machine for causing an operation of the bight-forming instrumentalities when the box part is in proper position to be operated upon.

37. A machine for forming and perpetuating substantially a U-shaped bight on a metallic binder secured to and extending from a box part, comprising means to bend the binder a distance from its end to swing the end over the box part and form substantially a U-shaped bight, means to bend the binder adjacent its end to form a prong, a driver to drive the prong into the box part, means to feed the box part through the machine, and means automatically to control the operations of the bight-forming instrumentalities in accordance with the passage of the box part through the machine.

38. A machine for forming and perpetuating substantially a U-shaped bight on a metallic binder secured to and extending from a box part, comprising means to bend the binder a distance from its end to swing the end over the box part and form substantially a U-shaped bight, a driver to drive the end of the binder into the box part to perpetuate the bight, and means to feed the box part through the machine.

39. A machine for forming and perpetuating substantially a U-shaped bight on a metallic binder secured to and extending from a box part, comprising means to bend the binder a distance from its end to swing the end over the box part and form substantially a U-shaped bight, a driver to drive the end of the binder into the box part to perpetuate the bight, means to feed the box part through the machine, and means automatically to control the operation of the bight-forming instrumentalities in accordance with the passage of the box part through the machine.

40. A machine for equipping a box part with a metallic binder and fastener, comprising means to apply a metallic binder to a box part, mechanisms to bend the binder to form substantially a U-shaped bight and to drive the end of the binder into the box part to perpetuate the bight, and means to feed the box part through the machine.

41. A machine for equipping box parts with a metallic binder and fastener, comprising means to apply a metallic binder to a box part, mechanisms to bend the binder to form substantially a U-shaped bight and to drive the end of the binder into the box part to perpetuate the bight, means to feed the box part through the machine, and means automatically to control the operations of the bight-forming mechanisms in accordance with the passage of the box part through the machine.

42. A machine for forming and perpetuating bights on a metallic binder secured to and con-

necting two box parts, comprising means to sever the binder between the box parts, means to swing each severed end over its box part to form substantially a U-shaped bight, means to drive each severed end into its box part to perpetuate the bights, and means to feed the box parts through the machine.

43. A machine for forming and perpetuating bights on a metallic binder secured to and connecting two box parts, comprising means to sever the binder between the box parts, means to swing each severed end over its box part to form substantially a U-shaped bight, means to drive each severed end into its box part to perpetuate the bights, means to feed the box parts through the machine, and means automatically to control the operations of the bight-forming instrumentalities in accordance with the passage of the box parts through the machine.

44. A machine for forming and perpetuating bights on a metallic binder secured to and connecting two box parts, comprising means to sever the binder between the box parts, means to swing each severed end over its box part to form substantially a U-shaped bight, means to drive each severed end into its box part to perpetuate the bights, means to feed the box parts through the machine, and means controlled by the box parts in their passage through the machine for causing an operation of the bight-forming instrumentalities when the box parts are in proper position to be operated upon.

45. A machine for equipping box parts with metallic binders and fasteners, comprising means to secure a metallic binder to a succession of box parts, means to sever the binder between box parts, means to swing each severed end over its box part to form substantially a U-shaped bight, means to drive each severed end into its box part to perpetuate the bights, and means to feed the box parts through the machine.

46. A machine for equipping box parts with metallic binders and fasteners, comprising means to secure a metallic binder to a succession of box parts, means to sever the binder between box parts, means to swing each severed end over its box part to form substantially a U-shaped bight, means to drive each severed end into its box part to perpetuate the bights, means to feed the box parts through the machine, and means automatically to control the operations of the bight-forming instrumentalities in accordance with the passage of the box parts through the machine.

47. A machine for equipping box parts with metallic binders and fasteners, comprising means to secure a metallic binder to a succession of box parts, means to sever the binder between box parts, means to swing each severed end over its box part to form substantially a U-shaped bight, means to drive each severed end into its box part to perpetuate the bights, means to feed the box parts through the machine, and means controlled by the box parts in their passage through the machine for causing an operation of the bight-forming instrumentalities when the box parts are in proper position to be operated upon.

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